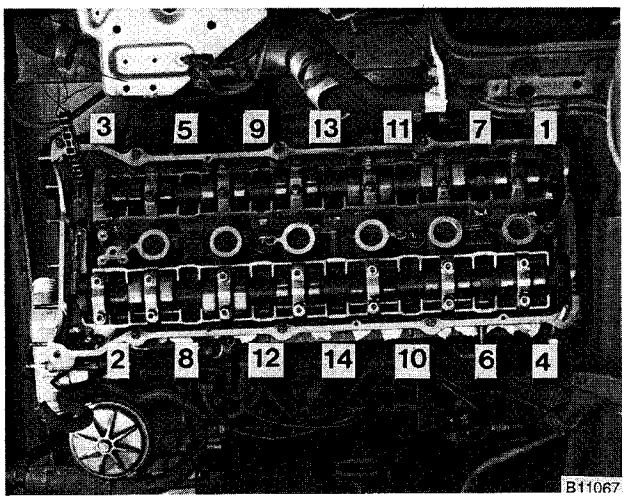

Fig. 40. Cylinder head bolt loosening sequence.

NOTE —
BMW special tool no. 11 2 250 is a thin-walled Torx E12 socket with an extended reach. The cylinder head bolts are recessed into the head below the camshaft towers with little working space.

36. Remove crankshaft locking tool (BMW special tool no. 11 2 300). Using the crankshaft vibration damper bolt, turn engine opposite its normal direction of rotation (counterclockwise as viewed from the front) approximately 45°. This prevents accidental contact between valves and pistons during installation.

NOTE —
Guide cam chain to keep it from jamming when turning the crankshaft.

Cylinder head, installing (6-cylinder engine)

CAUTION —
If the camshafts were removed and installed while the cylinder head was off, a minimum waiting time is required after installing the camshafts. When the camshafts are removed, the hydraulic lifters can expand. This expansion can cause increased valve lift when the camshafts are bolted down, resulting in open valves.

Cylinder head installation waiting times

- 68°F (20°C) and higher . . . . . 10 minutes
- 50-68°F (10-20°C) . . . . . 30 minutes
- 32-50°F (0-10°C) . . . . . 75 minutes

1. Clean cylinder head and gasket surfaces of cylinder block and all timing chain covers.

   - Remove all foreign matter and any liquid from bolt holes, then clean with a thread chaser.

CAUTION —
Do not use a metal scraper or wire brush to clean the aluminum cylinder head or pistons. If necessary, use a hard wooden or plastic scraper. Also available are abrasive discs to be used in conjunction with an electric drill. Be sure to use the correct disc for the type of metal being cleaned.

2. Check gasket surface of cylinder head and cylinder block for warpage using a straight edge.

NOTE —
If the cylinder head has been machined, a special 0.3 mm thicker gasket should be installed. The thicker gasket is available from an authorized BMW dealer.

3. Place new cylinder head gasket on cylinder block. Check that two locating dowels are correctly positioned in block and are not damaged.

NOTE —
The word "OBEN", printed on the gasket, should face up. The cylinder head gasket will fit correctly in only one orientation.

4. With camshafts locked in TDC position with BMW special tools as described earlier, set cylinder head in position, guiding primary chain through cylinder head opening.

CAUTION —
- *The camshafts must be locked in the TDC position at the rear of the cylinder head with BMW special tool no. 11 3 240 before installing the cylinder head.*
- *Make sure the crankshaft, which had been rotated approximately 45° opposite the direction of engine rotation, is still in that position before lowering the cylinder head into position.*

5. Lightly lubricate new cylinder head bolts. Loosely install bolts and their washers, then thread them in until they are finger tight. Install cylinder head-to-lower timing chain cover bolts finger tight.

CAUTION —
Torx-type cylinder head bolts should not be reused. They are stretch-type bolts and must always be replaced whenever loosened.